

Amendments to the claims:

1 1. (Currently Amended) A magnetic read head that has a head surface comprising:
2 a read sensor that forms a portion of said head surface and has first and second side walls
3 which extend into the read head from said head surface;
4 nonmagnetic electrically insulative first and second read gap layers~~[[;]]~~ wherein the first read
5 gap layer includes a read gap material layer and first and second refill gap layers;
6 the read sensor being located between the first and second read gap layers;
7 [[a]] the read gap material layer having first and second depressions which extend laterally
8 from the first and second side walls respectively of the sensor;
9 ~~nonmagnetic electrically insulative~~ the first and second refill gap layers being disposed in the
10 first and second depressions, but not disposed on at least a portion of each of said first and second
11 side walls; and engaging a bottom portion of the first side wall and engaging a bottom portion
12 of the second side wall respectively;
13 the first read gap layer having first and second portions which extend laterally from the first
14 and second side walls of the sensor and a third portion which engages a bottom surface of the sensor
15 and is located between said first and second portions;
16 each of said first and second portions having a thickness which is greater than a thickness of
17 said third portion; and
18 [[the]] a first lead layer [[being]] electrically connected to ~~said at least a top~~ portion of the
19 first side wall and [[the]] a second lead layer [[being]] electrically connected to ~~said at least a top~~ portion of the
20 second side wall.

1 2. (Currently Amended) A magnetic read head as claimed in claim 1 further
2 comprising:
3 a ferromagnetic first shield layer;
4 the first read gap layer interfacing the first shield layer;
5 ~~a nonmagnetic electrically insulative~~ the second read gap layer interfacing the sensor; and
6 a ferromagnetic second shield layer interfacing the second read gap layer.

1 3. (Currently Amended) A magnetic read head as claimed in claim 2 including:
2 first and second hard bias layers interfacing the first and second refill gap layers respectively
3 and ~~said at least a~~ the top portion of each of the first and second side walls~~[[;]]~~ respectively; and
4 said first and second lead layers interfacing the first and second hard bias layers~~[[.]]~~
5 respectively.

1 4. (Currently Amended) A magnetic head assembly comprising:
2 a write head;
3 a read head adjacent the write head comprising:
4 a read sensor that forms a portion of said head surface and that has first and second
5 side walls which extend into the read head from said head surface;
6 nonmagnetic electrically insulative first and second read gap layers~~[[;]]~~ wherein the
7 first read gap layer includes a read gap material layer and first and second refill gap layers;
8 the read sensor being located between the first and second read gap layers;
9 [[a]] the first read gap material layer having first and second depressions which
10 extend laterally from the first and second side walls respectively of the sensor;
11 ~~nonmagnetic electrically insulative~~ the first and second refill gap layers being
12 disposed in the first and second depressions, but not disposed on at least a portion of each
13 of said first and second side walls; and engaging a bottom portion of the first side wall and
14 engaging a bottom portion of the second side wall respectively;
15 the first read gap layer having first and second portions which extend laterally from
16 the first and second side walls of the sensor and a third portion which is between the first and
17 second portions and is located between the sensor and the first shield layer;
18 each of said first and second portions having a thickness which is greater than a
19 thickness of said third portion;
20 [[the]] a first lead layer [[being]] electrically connected to ~~said at least a~~ top portion
21 of the first side wall and [[the]] a second lead layer [[being]] electrically connected to ~~said~~
22 ~~at least a~~ top portion of the second side wall;
23 a ferromagnetic first shield layer;
24 the first read gap layer interfacing the first shield layer;
25 ~~a nonmagnetic electrically insulative~~ the second read gap layer interfacing the sensor;
26 and
27 a ferromagnetic second shield layer interfacing the second read gap layer.

1 5. (Currently Amended) A magnetic head assembly as claimed in claim 4 including:
2 first and second hard bias layers interfacing the first and second refill gap layers respectively
3 and ~~said at least a~~ the top portion of each of the first and second side walls~~[[;]]~~ respectively; and
4 said first and second lead layers interfacing the first and second hard bias layers~~[[.]]~~
5 respectively.

1 6. (Currently Amended) A magnetic disk drive comprising:
2 at least one magnetic head assembly;
3 the magnetic head assembly having a write head and a read head;
4 the read head including:

5 a read sensor that forms a portion of said head surface and has first and second side
6 walls which extend into the read head from said head surface;

7 nonmagnetic electrically insulative first and second read gap layers~~[[;]]~~ wherein the
8 first read gap layer includes a read gap material layer and first and second refill gap layers;

9 the read sensor being located between the first and second read gap layers;

10 [[a]] the read gap material layer having first and second depressions which extend
11 laterally from the first and second side walls respectively of the sensor;

12 ~~nonmagnetic electrically insulative~~ the first and second refill gap layers being
13 disposed in the first and second depressions, but not disposed on at least a portion of each
14 of said first and second side walls; and engaging a bottom portion of the first side wall and
15 engaging a bottom portion of the second side wall respectively;

16 the first read gap layer having first and second portions which extend laterally from
17 the first and second side walls of the sensor and a third portion which is between the first and
18 second portions and is located between the sensor and the first shield layer;

19 each of said first and second portions having a thickness which is greater than a
20 thickness of said third portion;

21 [[the]] a first lead layer ~~[[being]]~~ electrically connected to ~~said at least a top~~ portion
22 of the first side wall and ~~[[the]]~~ a second lead layer ~~[[being]]~~ electrically connected to ~~said~~
23 ~~at least a top~~ portion of the second side wall;

24 a ferromagnetic first shield layer;

25 the first read gap layer interfacing the first shield layer;

26 ~~a nonmagnetic electrically insulative~~ the second read gap layer interfacing the sensor;
27 and
28 a ferromagnetic second shield layer interfacing the second read gap layer;
29 a housing;
30 a magnetic medium supported in the housing;
31 a support mounted in the housing for supporting the magnetic head assembly with said head
32 surface facing the magnetic medium so that the magnetic head assembly is in a transducing
33 relationship with the magnetic medium;
34 a motor for moving the magnetic medium; and
35 a processor connected to the magnetic head assembly and to the motor for exchanging signals
36 with the magnetic head assembly and for controlling movement of the magnetic medium.

1 7. (Currently Amended) A magnetic disk drive as claimed in claim 6 including:
2 first and second hard bias layers interfacing the first and second refill gap layers respectively
3 and ~~said at least a~~ the top portion ~~of each~~ of the first and second side walls[[:]] respectively; and
4 said first and second lead layers interfacing the first and second hard bias layers[[:]]
5 respectively.

1 8. (Withdrawn) A method of making a read head that has a head surface for facing
2 a magnetic medium comprising the steps of:
3 forming a nonmagnetic electrically insulative read gap material layer;
4 forming a sensor material layer on the read gap material layer;
5 forming a mask on the sensor material layer with a width for defining a track width of the
6 sensor;
7 milling exposed portions of the sensor material layer to form a sensor with first and second
8 side walls that are spaced apart by said track width;
9 continuing to mill into the read gap material layer to form the read gap material layer with
10 first and second depressions which extend laterally from the first and second side walls respectively
11 of the sensor;

12 forming nonmagnetic electrically insulative first and second refill gap layers in the first and
13 second depressions and on the first and second side walls of the sensor;
14 milling portions of the first and second refill gap layers on the first and second sidewalls until
15 at least a portion of each of the first and second side walls is exposed; and
16 electrically connecting the first lead layer to said at least a portion of the first side wall and
17 electrically connecting the second lead layer to said at least a portion of the second side wall.

1 9. (Withdrawn) A method as claimed in claim 8 further comprising the steps of:
2 forming a ferromagnetic first shield layer;
3 forming said first gap layer on the first shield layer;
4 forming a nonmagnetic electrically insulative second read gap layer on the sensor and the first
5 and second lead layers; and
6 forming a ferromagnetic second shield layer on the second read gap layer.

1 10. (Withdrawn) A method as claimed in claim 9 further comprising the steps of:
2 interfacing first and second hard bias layers with said at least a portion of the first and second
3 side walls respectively; and
4 interfacing said first and second lead layers with the first and second hard bias layers.

1 11. (Withdrawn) A method as claimed in claim 10 wherein said milling is ion milling
2 at an angle of 70 degrees to a normal to a major plane of the first shield layer.

1 12. (Withdrawn) A method of making a magnetic head assembly comprising the steps
2 of:
3 forming a read head comprising the steps of:
4 forming a nonmagnetic electrically insulative read gap material layer;
5 forming a sensor material layer on the read gap layer;
6 forming a mask on the sensor material layer with a width for defining a track width of the
7 sensor;
8 milling exposed portions of the sensor material layer to form a sensor with first and second
9 side walls that are spaced apart by said track width;

10 continuing to mill into the first read gap material layer to form the read gap material layer
11 with first and second depressions which extend laterally from the first and second side walls
12 respectively of the sensor;

13 sputter depositing nonmagnetic electrically insulative first and second refill gap layers in the
14 first and second depressions and on the first and second side walls of the sensor;

15 milling portions of the first and second refill gap layers on the first and second sidewalls until
16 at least a portion of each of the first and second side walls is exposed;

17 electrically connecting the first lead layer to said at least a portion of the first side wall and
18 electrically connecting the second lead layer to said at least a portion of the second side wall;

19 forming a ferromagnetic first shield layer;

20 forming said first gap layer on the first shield layer;

21 forming a nonmagnetic electrically insulative second read gap layer on the sensor and the first
22 and second lead layers;

23 forming a ferromagnetic second shield layer on the second read gap layer; and

24 forming a write head on the read head.

1 13. (Withdrawn) A method as claimed in claim 12 further comprising the steps of:
2 interfacing first and second hard bias layers with said at least a portion of the first and second
3 side walls respectively; and

4 interfacing said first and second lead layers with the first and second hard bias layers.

1 14. (Withdrawn) A method as claimed in claim 13 wherein said milling is ion milling
2 at an angle of 70 degrees to a normal to a major plane of the first shield layer.

Add new claims 15-17.

1 15. (New) A magnetic read head as claimed in claim 1 including:
2 each of the first and second hard bias layers and the sensor having a top surface; and
3 the top surfaces of the first and second hard bias layers and the sensor lying within a common
4 plane.

1 16. (New) A magnetic head assembly as claimed in claim 4 including:
2 each of the first and second hard bias layers and the sensor having a top surface; and
3 the top surfaces of the first and second hard bias layers and the sensor lying within a common
4 plane.

1 17. (New) A magnetic disk drive as claimed in claim 6 including:
2 each of the first and second hard bias layers and the sensor having a top surface; and
3 the top surfaces of the first and second hard bias layers and the sensor lying within a common
4 plane.